Data Selection

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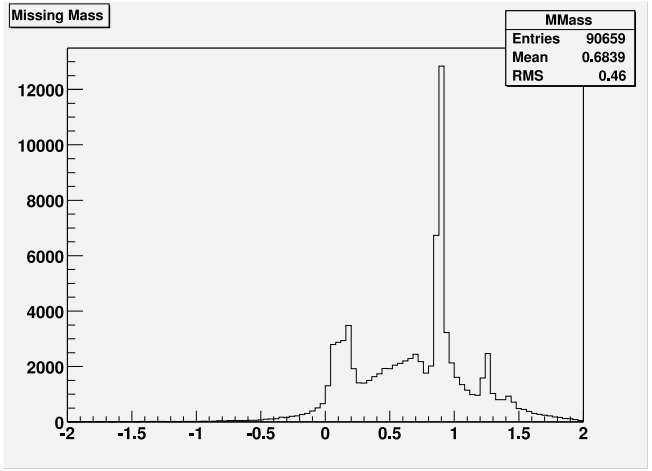
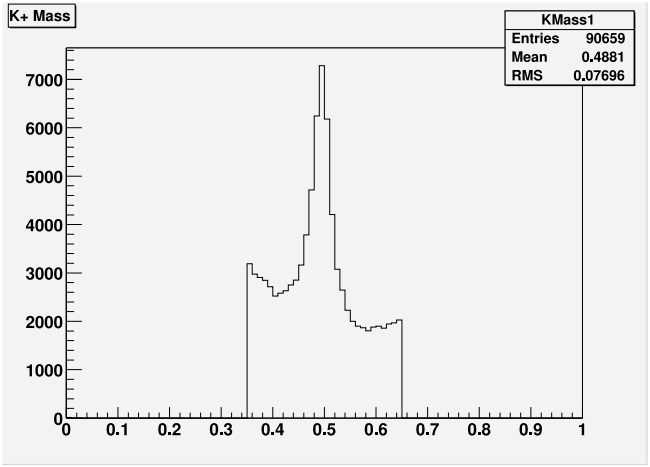
Look for θ^+ in the reaction $\gamma p \to \bar{K}^0_S \theta^+$, where $\bar{K}^0_S \to \pi^+\pi^-$ and the $\theta^+ \to K^+ n$.
i.e. $\gamma p \to K^+\pi^+\pi^- n$

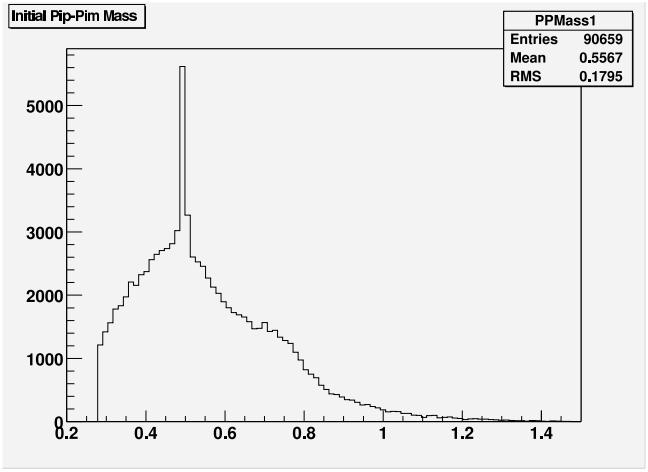
- g1c data from 3.1 GeV runs - 20926 to 21359
- skim data with 1 K^+, 1 π^+ and 1 π^-
- identify neutrons by missing mass, K^0_S by $\pi^+\pi^-$ invariant mass, and K^+ by TOF mass.
- 3000 events represents $\approx \frac{1}{4}$ of the total

Skimmed data

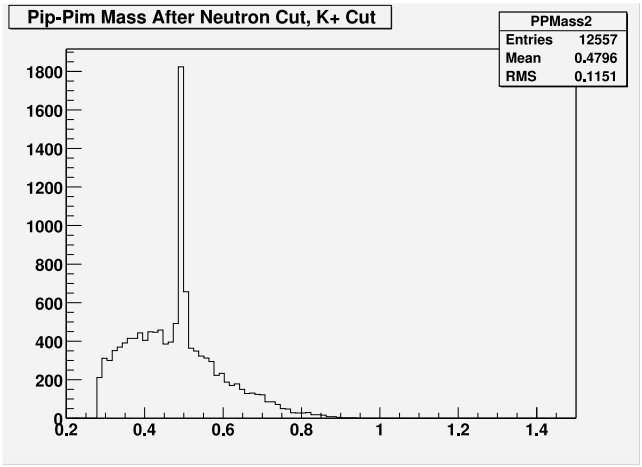


- $K^+\pi^+\pi^-$ skim
- 90K events (representing $\frac{1}{4}$ total)

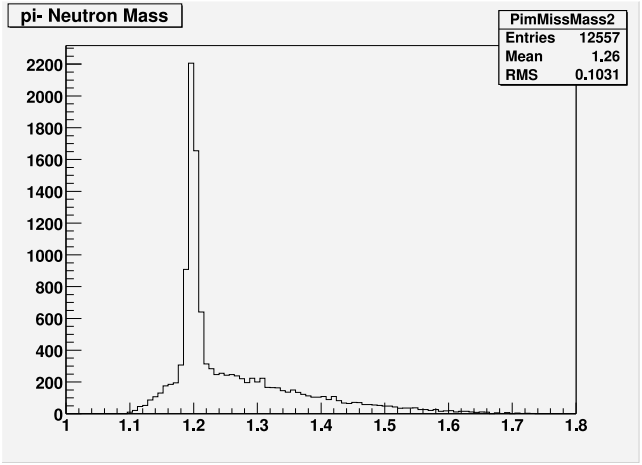


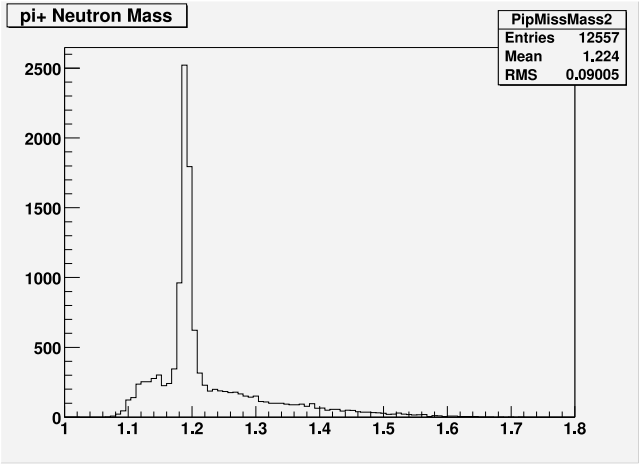


Missing mass cut, tighter K^+ cut

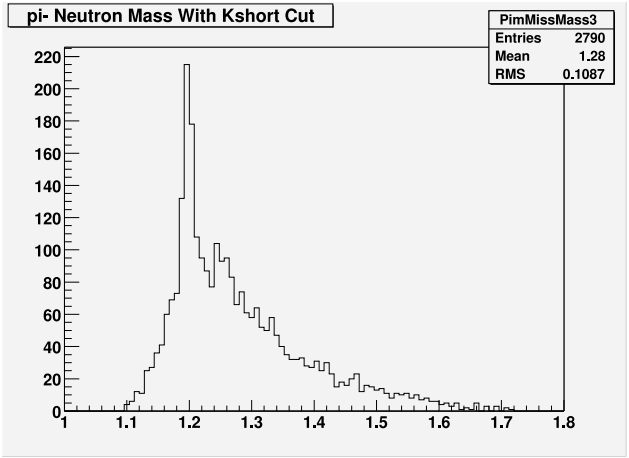


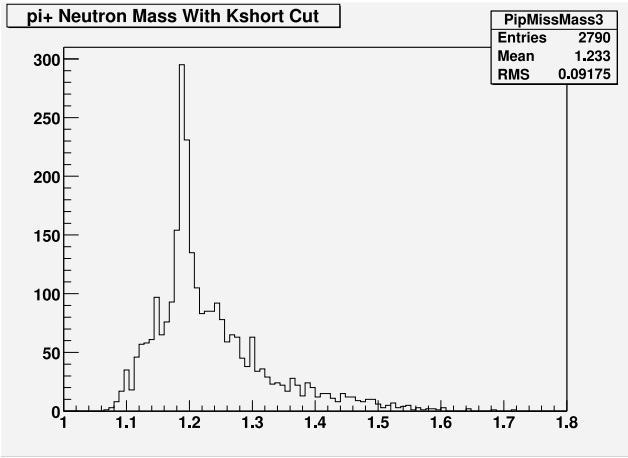
- Select neutron: $0.855 < mm^2 < 0.923$, $(\pm 2\sigma)$
- Tighten K^+ selection: $0.462 <$ M(TOF) < 0.527, $(\pm 2\sigma)$
- 12.5k events.
- Large Σ's are from non-K_S background under $\pi^+\pi^-$ peak.





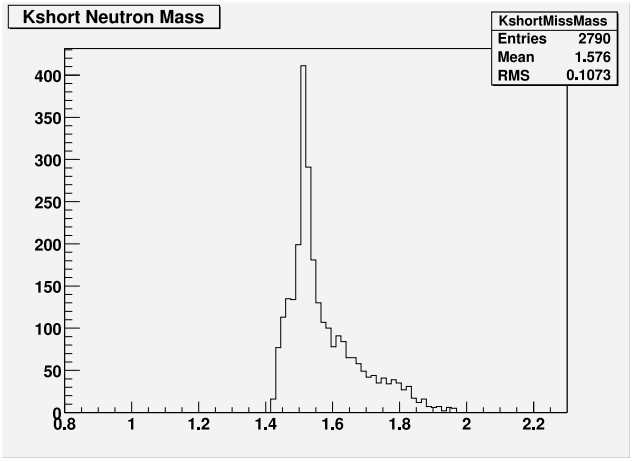
$\bar{K}^0_S$ cut

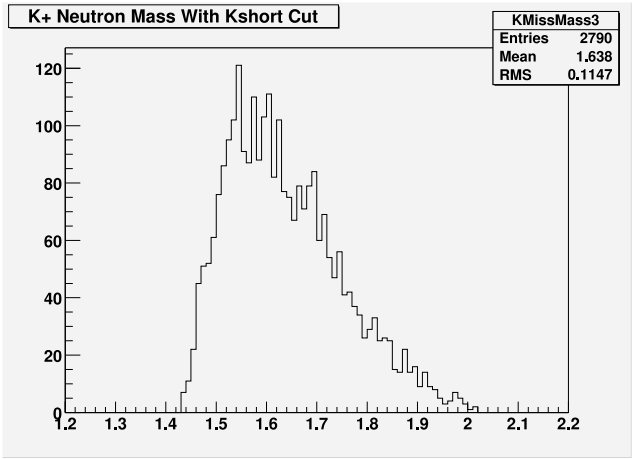




- Select $\bar{K}^0_S$: $0.477 < \mathrm{M}(\pi^+\pi^-) < 0.511$, $(\pm 2\sigma)$
- 3000 events.
- Σ peaks reduced.

$\bar{K}^0_S$ cut





- $\Lambda(1520)$ signal clear in $\bar{K}^0_S n$ mass spectrum
- No clear sign of $\theta^+(1530)$
- Complete g1c data gives factor of 3 more.